

EXPLANATION OF PLATE XV.

- Fig. 1. *Pipunculus terminalis*, part of wing.
 Fig. 2. *Pipunculus latipennis*, wing.
 Fig. 3. *Pipunculus latipennis*, antenna.
 Fig. 4. *Pipunculus latipennis*, ovipositor.
 Fig. 5. *Verrallia virginica*, antenna.
 Fig. 6. *Pipunculus cinctus*, wing.
 Fig. 7. *Verrallia virginica*, tip of abdomen, above.
 Fig. 8. *Pipunculus terminalis*, antenna, tip of abdomen, above.
 Fig. 9. *Verrallia virginica*, wing.
 Fig. 10. *Pipunculus cinctus*, antenna.

SYSTEMATIC PAPERS ON NEW ENGLAND
HEMIPTERA.¹II. SYNOPSIS OF THE PENTATOMIDÆ.²

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With Plate XVI.

Family PENTATOMIDÆ.

1. First segment of the rostrum largely free, relatively short and thick; bucculæ small, more or less distinctly united under the rostrum posteriorly, hence converging; insertion of rostrum close to end of tylus (fig. 4)

First segment of rostrum largely embedded between the bucculæ, relatively slender; bucculæ large, not united posteriorly, hence more or less parallel; insertion of rostrum separated from end of tylus by a space about equal to width of basal segment (fig. 1) *Pentatominae* Kirk 2

4. ASOPINÆ.

¹ Contributions from the Entomological Laboratory of the Bussey Institution, Harvard University, No. 98.

² I have found the following works, among others, to be of especial assistance in the study of this family:

Stål: Enum. Hem. I., K. Sv. Vet.-Ak. Handl. IX., 1870. Oef. K. Vet.-Ak. Förh., XXIV., No. 7, 1867, p. 522.

Van Duzee: List. Pent. N. Am., Tr. Am. Ent. Soc. XXX., 1904, p. 1. Can. Ent., XLI., 1909, p. 369, and other papers.

Kirkaldy: Cat. Hem. I., 1909, and other papers.

Heymons: Beitr. Morph. u. Entw. Rhynch. Nova Acta Ac. Leop. Carol. LXXIV., 1899.

Summers: Pr. Iowa Ac. Sci., VI., 1908, p. 40.

Bergroth: Ann. Soc. Ent. Belg., LVIII., 1914, p. 24. Ent. News, XVIII., 1907, p. 48, and other papers.

Bredden: Beitr. Sys. Pent. Süd-am., Sitz. Ges. Nat. Fr., 10, 1907, p. 328.

Schouteden: Gen. Ins., Het., 1905-1907.

Torre Bueno: Ent. News, XXIII, 1912, p. 316.

Correction: PSYCHE, June, 1915, p. 93, in the description of the Pentatomidæ the tarsi should be given as 2- or 3-segmented.

2. Tarsi 2-segmented; sternum with a distinct longitudinal keel; frena¹ extending almost to end of scutellum.....3. ACANTHOSOMATINÆ
Tarsi 3-segmented; sternum without keel; frena shorter.....3
3. Scutellum large, broad at apex, extending farther posteriorly than the corium; frena very short; sides of the pronotum with a single prominent tooth just anterior to lateral angle, the angles thus emarginate

1. GRAPHOSOMATINÆ

Scutellum smaller, more or less narrowed apically, generally shorter than the corium; frena longer; pronotum with numerous teeth or with no tooth near lateral angle.....2. PENTATOMINÆ²

1. Subfamily GRAPHOSOMATINÆ.

Tribe PODOPINI.

Genus *Podops* Laporte.

Size larger, length about 6.5 mm.; 2d, 3d, and 4th segments of antennæ darker; lateral tooth of pronotum obtuse; color very dark brown....*cinctipes* Say.

Size smaller, length 5 mm.; 2d, 3d, and 4th segments of antennæ paler; lateral tooth of pronotum acute; color as in the preceding.....*parvula* V. D.

2. Subfamily PENTATOMINÆ.

1. Body very flat, margins explanate; head with thin dilated margin, about as wide as base of scutellum, flat above; scutellum broad, scarcely narrowed apically (fig. 5)1. SCIOCORINI

Body not extremely flat and explanate; head not very widely dilated, when nearly as wide as base of scutellum head is distinctly convex above, usually narrower than scutellum.....2

2. Juga with a prominent lateral tooth near apex (fig. 3); abdomen shallowly sulcate beneath; rostrum extending behind posterior coxæ.....2. HALYINI

Juga without lateral tooth (fig. 6); abdomen not sulcate; rostrum shorter

3. PENTATOMINI

1. Tribe SCIOCORINI.

Genus *Sciocoris* Fallén.

Color brown, connexivum³ spotted; length 6.5 mm (fig. 5).⁴ *microphthalmus* Flor.

¹ The frena are longitudinal grooves in the edges of the scutellum which receive the inner margins of the hemelytra. They end about where the clavus disappears beneath the scutellum.

² In the latest general catalogue (Kirkaldy, 1909) the Acanthosomatinae and Graphosomatinae are given as tribes of the Pentatominae. This matter is still open to discussion, I believe, but in the present series I plan to follow the check-list of Van Duzee, to whom I am again indebted for advance information.

³ The marginal region of the abdomen. There are very few records of the occurrence of *Sciocoris* in this country, and collectors should be on the watch for it.

⁴ The ocelli in this species are very small and unfortunately do not show in the figure.

2. Tribe HALYINI.

Genus *Brochymena* Amyot et Serville.

1. Lateral angles of thorax distinctly produced in a short truncated dentate lobe, not rounded anteriorly; scutellum with a distinct transverse elevation at base; connexivum very wide; color indistinctly mottled grayish brown; length 14-16 mm. *arborea* Say.
Lateral processes less abrupt, rounded anteriorly, finely denticulate; scutellum less strongly elevated at base. 2
2. Juga extending much beyond apex of tylus, contiguous anteriorly, or separated, thus forming a long narrow apical sinus; connexivum moderately wide; color as in the preceding; length 15-17 mm. *quadripustulata* Fab.
Juga extending but little beyond apex of tylus, tips more or less convergent above, forming a short, sometimes transverse sinus; connexivum narrow; markings more contrasted; length 13-17 mm.
carolinensis Westw. or *annulata* Fab.

3. Tribe PENTATOMINI.

1. Head very convex above, triangular, almost as broad as scutellum; juga distinctly longer than tylus; apex of corium broadly rounded. 2
Head more nearly flat above, narrower; juga often not longer than tylus; apex of corium generally with a distinct, but sometimes rounded angle; if juga are longer than tylus, or apex of corium is broadly rounded, head is not more than two-thirds width of scutellum. 3
2. Anterior angles of pronotum projecting distinctly forward; pronotum with three longitudinal pale stripes 10. *Aelia*
Anterior angles not so projecting; pronotum with one stripe. 11. *Neottiglossa*
3. Base of abdomen armed below with a median spine or tubercle, directed anteriorly 17
Base of abdomen unarmed. 4
4. Lateral margins of juga widely reflexed and greatly thickened; orifices placed a little farther outward than lateral margin of intermediate coxal cavities, not elevated; front of head almost vertical. 15. *Murgantia*
Lateral margins of juga not or only narrowly reflexed, not greatly thickened; orifices and head usually otherwise constructed. 5
5. Scutellum broad and rounded at apex, lateral margins almost straight; head strongly bent downwards. 12. *Cosmopepla*
Scutellum generally narrowed at apex, lateral margins concave (as in fig. 2); head not or slightly bent downwards. 6
6. Orifices without sulcus, or with sulcus which ends abruptly 7
Orifices with a gradually disappearing prolongation. 14
7. Veins of membrane irregularly anastomosing or with numerous branches more or less distinct 8
Veins simple or slightly branched. 10
8. Scutellum broadly rounded at apex, as long as corium; apical margin of corium rounded, apical lateral angle obtuse. 8. *Cœnus*
Scutellum narrowed at apex, shorter than corium; apical margin straight, apical lateral angle acute. 9

9. Frena extending just to middle of scutellum; bucculae increasing in height posteriorly, ending abruptly; lateral margin of pronotum not explanate; rostrum extending a little beyond intermediate coxae.9. *Hymenarcys*
Frena extending beyond middle of scutellum; bucculae decreasing in height posteriorly, elevated anteriorly into an angle; lateral margin of pronotum explanate in front; rostrum extending beyond intermediate coxae 13. *Meneclis*.
10. Frena extending beyond middle of scutellum.11
Frena shorter2. *Trichopepla*
11. Tibiae distinctly and broadly sulcate throughout their length.12
Tibiae not so sulcate.14
12. Lateral margins of pronotum crenulate, lateral angles prominent, rounded or acuminate; head rather elongate.7. *Euschistus*
Lateral margins of pronotum not crenulate, lateral angles not prominent; head shorter.13
13. Form elongate; color olivaceous green; second and third segments of rostrum nearly equal, fourth shorter.4. *Rhytidolomia*
Form broad; color clear green; second segment of rostrum longer than third, third nearly equal to fourth.3. *Chlorochroa*
14. Thorax armed on each side with a long anteriorly projecting spine; first segment of rostrum shorter than bucculae; form elongated; margin of scutellum concolorous.6. *Solubea*.
Thorax unarmed; first segment of rostrum longer than bucculae; form broad; scutellum outlined with white.5. *Mormidea*
15. Jugal not longer than tylus.14. *Thyanta*
Jugal longer than tylus, almost or quite contiguous in front (somewhat as in fig. 5)16
16. Prothorax with conspicuous white impunctate margins extending around lateral angles.1. *Peribalus*
Prothorax without such margins, impunctate anteriorly only 19. *Dendrocoris*
17. Fifth antennal segment more than twice the length of second; apex of scutellum and anterior region of prothorax lighter; species olivaceous green in color 18. *Banasa*
Fifth antennal segment less than twice length of second; scutellum and prothorax concolorous; species clear green in color.18
18. Orifices short, rather broad, not extending more than half way to lateral margins of metapleura, ending abruptly.17. *Nezara*
Orifices continued in a long narrowing ruga, extending almost to posterior lateral angles of mesopleura.16. *Acrosternum*

1. Genus *Peribalus* Mulsant et Rey.*Holcostethus* Kirk. in part.

Color brown, tip of scutellum and margins of body more or less pale; length 7.5-9 mm. *limbolarius* Stal.

2. Genus *Trichopepla* Stal.

Color brown with faint paler markings; connexivum spotted; body pilose; length 6.5-8 mm. *semivittata* Say.

3. Genus *Chlorochroa* Stal.*Pentatoma* Auct. in part.*Rhytidolomia* Kirk, in part.

Color green, margins of body and tip of scutellum reddish yellow; length 12-14 mm.
uhleri Stal or persimilis Horv.¹

4. Genus *Rhytidolomia* Stal*Pentatoma* Auct. in part.

Larger, length 16 mm.; lateral margins of pronotum narrowly reflexed (fig. 6) color dark olive brown, the margins paler.....senilis Say.
Smaller, length 9.5-11 mm., pronotal margins not reflexed; color dark olive, with median and lateral pale stripes.....saucia Say.

5. Genus *Mormidea* Amyot et Serville.

Color dark brown, pronotum with two transverse pale stripes, lateral margins of scutellum and edges of connexivum pale; length 6 mm.....lugens Fab.

6. Genus *Solubea* Bergroth.*Ocbalus* Stal.

Color light brown, scutellum and markings of head paler; length 8-10 mm.
pugnax Fab.

7. Genus *Euschistus* Dallas.

1. Pronotum with a distinct more or less impunctate raised line running transversely between the lateral angles; pronotum distinctly wider than the abdomen; juga generally somewhat longer than the tylus; color variable, generally some shade of brown throughout the genus; length about 11 mm.

ictericus Linn.

Pronotum without such a line, proportionately narrower.....2

2. Juga distinctly longer than the tylus, apex of head thus emarginate; hemielytra covering the connexivum; length 12-15 mm.

fissilis Uhl. or euschistoides Voll.

Juga not or very slightly longer than the tylus, apex of head thus rounded or truncate.....3

3. Lateral angles of the ventral abdominal segments concolorous; genital plate of the male with a dark spot (fig. 7); form somewhat narrowed posteriorly; length about 13 mm.....variolarius Pal. Beauv.

Lateral angles of the ventral segments with a black dot; hemielytra generally not covering the connexivum.....4

4. Smaller, length 8-9 mm., form rather flattened; lateral margins of pronotum pale and somewhat swollen, the closely set marginal punctures forming a distinct black band.....politus Uhl.

Larger, length 10 mm. or more; form more convex.....5

5. Larger, length 12-15 mm; abdomen without a median ventral row of black spots servus Say.

Smaller, length 10-12 mm.; abdomen usually with a median ventral row of black spots more or less developed.....tristigmus Say.

¹ These forms are considered identical by Van Duzee.

8. Genus *Cœnus* Dallas.

Color brown, finely dotted with black; length about 8 mm. *delius* Say.

9. Genus *Hymenarcys* Amyot et Serville.

Lateral margins of pronotum arcuate; larger, length 9 mm.; color dark brown
nervosa Say.

Laterals margins of pronotum straight; smaller, length 7.5 mm.; color about as in preceding. *æqualis* Say.¹

10. Genus *Aelia* Fabricius.

Color light brown with longitudinal pale stripes; length 8 mm. *americana* Dallas

11. Genus *Neottiglossa* Kirby.

Color brown with rather faint pale markings; length about 5 mm. *undata* Say.

12. Genus *Cosmopepla* Stal.

Color black with red markings; length about 5 mm.
lintneriana Kirk. or *carnifex* Fab.

13. Genus *Meneclis* Stal.

Color brown, connexivum spotted; length 13 mm. *insertus* Say.

14. Genus *Thyanta* Stal.

Scutellum less elongated apically, shorter as a whole (fig. 2); form of body shorter and broader; colors constant, dark green, prothorax narrowly black laterally, and with a distinct purplish transverse band between the lateral angles; length about 9 mm. *calceata* Say.²

Scutellum more elongated apically, longer as a whole (fig. 2); general form more elongated; colors variable, very light to dark green, transverse band of pronotum more or less distinct; length about 11 mm. *custator* Fab.²

15. Genus *Murgantia* Stal.

Color black, variegated with red; length 10 mm. *histrionica* Hahn.

16. Genus *Acrosternum* Fieber.

Nezara Kirk. in part.

Form broadly oval; sides of pronotum arcuate anteriorly; rostrum scarcely reaching intermediate coxæ; color shining clear green; length about 17 mm.

pen(n)sylvanicum (de G.) Pal. Beauv.

Form more elongate; sides of pronotum straight anteriorly; rostrum reaching intermediate coxæ; color and size about as in preceding. *hilare* Say.

17. Genus *Nezara* Amyot et Serville.

Color dull green; length about 16 mm. *viridula* Linn.

¹ Asterisk marks species not known to occur in New England. Dagger marks species which I have not seen.

² For further details regarding these species and figures of the male genitalia, see Barber: Jour. N. Y. Ent. Soc., XIX., 1911, p. 9.

18. Genus *Banasa* Stal.

1. Posterior lateral angles of abdominal segments acuminate, projecting somewhat; color brownish; 10 mm. *sordida* Uhl.
 Posterior lateral angles obtuse, not very prominent. 2
2. Third antennal segment about twice as long as second; head broad anteriorly; margin of abdomen with conspicuous black dots at the angles of the segments; color greenish with olivaceous markings; length 7.5–11 mm. . . *dimi(di)ata* Say.
 Third antennal segment but little longer than the second; head narrowed anteriorly; margin of abdomen with conspicuous black dots; ventral abdominal punctures fewer and paler; genital plate of male narrower; colors somewhat paler; length 9–11 mm. *calva* Say.

19. Genus *Dendrocoris* Bergroth.

- Color brown, with paler areas of variable extent, connexivum spotted; length 6.5–7.5 mm. *humeralis* Uhl.

3. Subfamily ACANTHOSOMATINÆ.

- Lateral angles of pronotum emarginate; posterior lateral margins depressed; orifices abruptly curved, short. 1. *Elasmucha*.
 Lateral angles entire; posterior lateral margins not depressed; orifices nearly straight, longer. 2. *Elasmostethus*

1. Genus *Elasmucha* Stal.

- Color yellowish brown, mottled with reddish, variable in shade; length 7–9 mm. *lateralis* Say.

2. Genus *Elasmostethus* Fieber.

1. Antennæ black or dark brown; punctures of pronotum concolorous except along posterior margin; color pale yellowish with reddish markings; length 10 mm. **atricornis* V. D.
 Antennæ pale; pronotal punctures dark. 2
2. Larger, length 10 mm.; pronotum broader and shorter; color greenish yellow with reddish markings. *cruciatus* Say.
 Smaller, length 8 mm.; pronotum narrower and longer; colors as in preceding † **cooleyi* V. D.

4. Subfamily ASOPINÆ.

Arminæ Bergr.

Cimicinæ Kirk.

1. Anterior femora armed with a spine or prominent tubercle near apex. 2
 Anterior femora unarmed. 3
2. Scutellum large, broad, extending almost or quite to end of abdomen; frena not over one-third the length of the scutellum. 6. *Stiretrus*
 Scutellum moderate in size, attenuated apically; frena extending to middle of scutellum 1. *Perillus*.
3. Base of abdomen armed below with a spine or tubercle. 4
 Base of abdomen unarmed. 3. *Zicrona*

4. Frena extending beyond middle of scutellum; bucculae slightly elevated, disappearing posteriorly.....5
 Frena extending to middle of scutellum; bucculae distinctly elevated, not thinning out posteriorly; male with two patches of silken pubescence on the abdomen below.....2. **Mineus**
5. Larger, length usually over 13 mm.; tylus generally shorter than juga, apex of head thus emarginate.....4. **Apateticus**
 Smaller, length usually less than 13 mm.; tylus as long as juga, apex of head thus truncate.....5. **Podisus**

1. Genus **Perillus** Stal.

Perilloides Schouteden.

- Anterior femora armed with a low conical tubercle; color entirely black, or black with red or yellowish markings; length 5-7 mm.....**exaptus** Say.
 Anterior femora armed with a more or less cylindrical blunt spine; color brown with pale yellowish markings; length 8-10 mm.....**circumcinctus** Stal.

2. Genus **Mineus** Stal.

- Color bluish black with red markings; length 8 mm.....**strigipes** H. S.

3. Genus **Zicrona** Amyot et Serville.

- Color iridescent greenish blue; length 6 mm.....**cærulea** Linn.

4. Genus **Apateticus** Dallas.

- Vaginal plate of the female genitalia triangular (fig. 8); pronotal spines shorter and less acute; anterior lateral margins of pronotum more distinctly serrulate; color brown; length 13-18 mm.....**bracteatus** Fitch.
 Vaginal plate quadrangular (fig. 9); pronotal spines longer and more acute; anterior lateral margins of pronotum very finely serrulate; color as in the preceding; length 16-20 mm.....**cynicus** Say.

5. Genus **Podisus** Herrich-Schæffer.

1. Lateral angles of pronotum blunt, projecting but little; membrane without a dark longitudinal stripe; color mottled brown; length 9-11 mm., **placidus** Uhl.
 Lateral angles distinctly projecting, more or less spine-like; membrane with a dark longitudinal stripe.....2
2. Color usually reddish brown; basal spine of abdomen short, not extending between hind coxæ; lateral angles of pronotum rather blunt.....3
 Color grayish brown; basal spine of abdomen long, extending between hind coxæ; lateral angles acute; length 10-12.5 mm.....**maculiventris** Say.
3. Smaller, length 7-8 mm.; form narrow; second antennal segment one-fourth longer than the third; color pale reddish brown.....**modestus** Dallas.
 Larger, length 8-10 mm.; form wider; second antennal segment one-third longer than the third; color darker.....**serieventris** Uhl.

6. Genus **Stiretrus** Laporte.

- Color very variable, green with white or yellowish markings in New England specimens, blue and red in various combinations in forms from other regions; length about 9 mm.....**anchorage** Fab.